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PATENT
Case No. N0080US

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Appl. No.	:	09/729,939
Applicant	:	Rajashri Joshi et al.
Filed	:	December 5, 2000
Titled	:	Method and System for Representation of Geographic Features In a Computer-based System
TC/A.U.	:	2164
Examiner	:	Mellissa M. Chojnacki
Docket No.	:	N0080US

Mail Stop Appeal Brief – Patents
Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450

REPLY BRIEF

Appellants file this Reply Brief in response to the Examiner's Answer mailed March 16, 2009. The headings in this Reply Brief correspond to the headings in the Appeal Brief to which the Appellants' responses are directed. Appellants are also filing a Request for Oral Hearing with this Reply Brief. Please charge the associated fees to Deposit Account No. 50-0728.

(7) ARGUMENT

A. Claims 1-3, 8-14, 16-27, 29-34 and 36-37 are not obvious in view of the combination of Sennott and Bargar.

In the Appeal Brief, Appellants argued that each of the independent claims 1, 14, 16, 23 and 29 recite a claim element that is not a known element in the art and is not disclosed in Sennott and Bargar. The independent claims each generally recited a claim element of generating (or deriving) control points for a spline by applying (or using) a least squares approximation to data points specifying latitude and longitude coordinates; the exact language of the respective claim elements is recited in the Appeal Brief. In response, the Examiner's Answer provided identical arguments for all of the independent claims based on the combination of Sennott and Bargar. Appellants will reply to those identical arguments only once in the following paragraphs rather than reply with respect to each independent claim separately.

The Examiner provided that Sennott discloses using a least square fit to determine objects in a path. (Examiner's Answer, pages 35, 37, 38, 41, 42, 44, 46 and 48). Appellants respectfully point out that this use of least square fit method in Sennott is applied to height data, not the applying least squares approximation to data points specifying longitude and latitude coordinates as recited in the independent claims. Additionally, the least square fit method of Sennott is applied after the vehicle path has been modeled. That is, the least squares fit is not used to model the path; rather, once the path is modeled from position points, the least squares fit is used to identify objects on the path (objects having height greater than the expected height of the path). (See, Sennott: column 71, line 64 – column 72, line 5). Thus, the application of the least square fit in Sennott teaches away from the recited claim elements that apply the least squares

approximation to data points to generate the polynomial spline which models the geographic feature, such as a path or road.

The Examiner also provided that "Sennott does not explicitly teach thar the calculation for determining objects (geographic) features in the path (polynomial spline) is done by applying the least square approximation to the polynomial spline (which is the path), so the examiner has added the Bargar reference and the Eberwine reference (which will be addressed below) in order to show that in the navigation field "least squares approximation" can be a method applied to polynomial spline in order to determine the path." (Examiner's Answer, pages 35, 37, 39, 41, 42, 43, 44, 46, 49). In this argument, the Examiner misstates the plain language of the independent claims as well as interprets the claim element in a manner that is not supported by the clear claim language and the description of the specification. Nothing in the claim language or specification supports the Examiner's statement that least squares approximation is applied to the polynomial spline. The claim elements clearly state that the least squares approximation is applied to the data points to generate the control points for the polynomial spline. The Examiner appears to be using the teaching of Sennott of applying least squares to the modeled path when making this statement rather than using the plain language of the claims.

The Examiner further provided that Sennott teaches that a path can be determined fitting a polynomial spline and that the points disclosed in the path (control points) can be latitude and longitude. (Examiner's Answer, pages 36, 39, 47, 49). The Appellants respectfully point out that control points, as known to one skilled in the art and as described in the specification, are not points (represented by latitude and longitude coordinates) located on the path; rather, control points are computed to define the polynomial spline. The polynomial spline and control points are known to one skilled in the art and are clearly defined in the specification at page 7, line 11-

24. Accordingly to the claimed invention, the points located on the geographic feature (such as a path/road) are used to generate the control points of the polynomial spline.

The Examiner further states that Bargar discloses calculating or smoothing the path by applying a least squares approximation to the splines. (Examiner's Answer, pages 35, 38, 39). Bargar discloses using a least squares error measure to evaluate the computed polynomial spline whose control points were generated using a genetic algorithm. (See, Bargar: column 5, lines 7-9; column 6, lines 1-23, 60-64). Although Bargar discloses applying least squares error measure to the solution splines, applying least squares approximation to the polynomial spline is not the recited claim element. The Examiner also stated that Bargar teaches that when calculating a smooth path a least squares approximation equation can be used to fit the polynomial spline. (Examiner's answer, page 36). Appellants respectfully point out that this is not an accurate statement for similar reasons stated above, namely Bargar teaches computing the polynomial spline using a genetic algorithm not computing the control points for the spline using a least squares approximation.

Moreover, both Sennott and Bargar teach away from the claimed invention. Both Sennott and Bargar discuss and require robust and very accurate fits for the splines that cannot be achieved with the claimed least squares approximation. Sennott discloses using a robust method to fit the B-splines to the path for the autonomous mining vehicle to ensure continuity in curvature that will allow the vehicle to steer and readily follow the path. (See, Sennott: column 50, lines 58-66; column 52, lines 2-14). Likewise, Bargar's genetic algorithm also provides a very robust fit to model splines to the movement of a wand type input device from arm gestures. (see Bargar: column 6, lines 35-38). These robust fits of Sennott and Bargar would not be achieved by the least squares approximation of the recited claim element.

B. Claims 1-3, 8-14, 16-27, 29-34 and 36-37 are not obvious in view of the combination of Sennott and Eberwine.

In the Appeal Brief, Appellants argued that each of the independent claims 1, 14, 16, 23 and 29 recite a claim element that is not a known element in the art and is not disclosed in Sennott and Eberwine. The independent claims each generally recited a claim element of generating (or deriving) control points for a spline by applying (or using) a least squares approximation to data points specifying latitude and longitude coordinates; the exact language of the respective claim elements is recited in the Appeal Brief. In response, the Examiner's Answer provided identical arguments for all of the independent claims based on the combination of Sennott and Eberwine. The Examiner repeated the arguments discussed above with regard to Sennott and applied new arguments with regard to Eberwine. For convenience, Appellants will point out errors in the statements regarding Eberwine made in the Examiner Answer.

The Examiner provided that Eberwine discloses "a navigation system which determines object motion parameters and determining air paths in order to avoid collisions, wherein in order to determine path least square approximation can be applied to the polynomial spline, wherein the coefficients are latitude and longitude points in order to determine feature paths. (See column 10, lines 1-40)." (Examiner's Answer, pages 41, 42, 43, 45, 47, 49). In this argument, the Examiner misstates the plain language of the independent claims as well as interprets the claim element in a manner that is not supported by the clear claim language and the description of the specification. Nothing in the claim language or specification supports the Examiner's statement that least squares approximation is applied to the polynomial spline. The claim elements clearly

state that the least squares approximation is applied to the data points to generate the control points for the polynomial spline.

The Examiners statement "wherein the coefficients are latitude and longitude points in order to determine feature paths" is also an erroneous statement. Eberwine models a flight path as a second order polynomial $X_o + X_1t + X_2t^2$ where X_o is the position at time zero, X_1 is the velocity coefficient and X_2 is the acceleration coefficient wherein a set of these coefficients is generated for each dimension of (latitude, longitude and altitude). (See, Eberwine: column 8, lines 44-67). Eberwine discloses computing these coefficients for the disclosed second order polynomial from consecutive aircraft positions (latitude, longitude and altitude) using a least squares approximation. (See, Eberwine: column 10, lines 1-40. The coefficients of Eberwine are second order polynomial coefficients. Simply, Eberwine only discloses applying the least squares approximation to fit a second order polynomial equation not applying the least squares approximation to generate the control points for a polynomial spline. As known to one of ordinary skill in the art and as disclosed in the specification, a polynomial spline is not equivalent to a second order polynomial.

Moreover, combining Sennott with the teachings of Eberwine would render Sennott unsatisfactory for its intended purpose. Sennott discloses using a robust method to fit the B-splines to the path for the autonomous mining vehicle to ensure continuity in curvature that will allow the vehicle to steer and readily follow the path. (See, Sennott: column 50, lines 58-66; column 52, lines 2-14). The robust fit required in Sennott cannot be obtained by fitting a second order polynomial equation using least squares approximation to position data as taught by Eberwine. Because the proposed modification to Sennott would render Sennott's invention

being modified unsatisfactory for its intended purpose, there is no suggestion or motivation to make the proposed modification.

ARGUMENT SUMMARY AND CONCLUSION

For the foregoing reasons, together with those set forth in Appellants' Appeal Brief, Appellants respectfully submit that the rejections are in error and request reversal of the rejections and allowance of all pending claims in this application

Respectfully submitted,

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